GRAPHIC EDITOR USER INTERFACE FOR A POINTER-BASED COMPUTER SYSTEM

This is a continuation of application Ser. No. 08/001,120, filed Jan. 5, 1993, now abandoned.

BACKGROUND OF THE INVENTION

The present invention relates generally to editing graphics in a pointer based computer system. More particularly, a graphics editor user interface is described.

The use and popularity of pointer based computer systems, including pen-based, stylus-based, track ball, and mouse driven systems has been increasing dramatically in recent years. This increased popularity is typically attributed to the ease of use of such machines, when compared to traditional computing systems that utilize only a keyboard as an input device.

A pen-based computer system is a small, often hand held, computer system in which the primary method for inputting data includes a stylus or "pen". A typical pen-based computer system is housed in a generally rectangular enclosure, and has a dual-function display assembly providing a viewing screen along one of the planar sides of the enclosure. The dual-function display assembly serves as both an input device and an output device. When operating as an input device, the display assembly senses the position of the tip of the stylus on the viewing screen and provides positional information to the computer's central processing unit (CPU). Some display assemblies can also sense the pressure of the stylus on the screen to provide further information to the CPU. When operating as an output device, the display assembly presents computer-generated images on the screen.

The dual-function display assembly of a pen-based computer system permits users to operate the computer as a computerized notepad. For example, graphical images can be input into the pen-based computer by merely moving the stylus on the surface of the screen. As the CPU senses the position and movement of the stylus, it generates a corresponding image on the screen to create the illusion that the stylus is drawing the image directly upon the screen. With suitable recognition software, text and numeric information can also be entered into the penbased computer system in a similar fashion.

Besides serving as a notepad, pen-based computers can provide a number of useful functions, such as serving as an address book, an appointment calendar, a to-do list, etc. These functions can be tightly integrated with the operating system of the computer, permitting information input into one function to impact upon another function.

Users of pointer and pen based computer systems often want to be able to edit graphical objects that are displayed on the screen. It is therefore desirable that a readily usable user interface be provided to facilitate the editing of graphics.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a graphical editor user interface which is particularly well suited for use in pointer based computer systems.

To achieve the foregoing and other objects and in accordance with the purpose of the present invention, a method for editing objects displayed on the screen of a display assembly of a pointer based computer system is described.

In its general aspects, the method includes the step of selecting at least a portion of an object to be edited. This selected portion is then highlighted and preferably editing handles are provided at designated positions relative to the selected portions of the object. Additionally, a bounding box is drawn about the selected portions of the object. In various aspects of the invention, the user is then permitted to edit the object by executing specific actions.

In one aspect of the invention the user may resize the selected portion of the object during the editing step. Resizing occurs when the user places the pointer on the perimeter of the bounding box and drags the pointer across the screen. This action causes the selected portion of the object to be resized as a function of the movements of the pointer across the screen.

In another aspect of the invention, the user may move the object during the editing step. Moving occurs when the user places the pointer within the bounding box at a location that is not substantially directly over either the bounding box or any selected portion of the object and then drags the pointer across the screen. This action causes the entire object to move as a function of the movements of the pointer across the screen.

In another aspect of the invention, the user may distort the object during the editing step. Distortion occurs when the user places the pointer on one of the editing handles and drags the pointer across the screen. This action causes the object to be distorted as a function of the movements of the pointer across the screen.

In still another aspect of the invention, the user may move the selected portion of the object independent of any non-selected portions of the object. Selected portion moving occurs when the user places the pointer on the selected portion of the object at a location that is not substantially directly over an editing handle and then drags the pointer across the screen. This action causes the selected portion of the object to be moved as a function of the movements of the pointer across the screen.

In yet another aspect of the invention, the user is permitted to duplicate the selected portion of the object by tapping on the screen at a location that is within the bounding box.

After any one of the editing maneuvers is performed, the display is updated to reflect any changes made during the editing step. When a duplication operation is performed, the duplicate of the selected portion of the object is displayed at a position that is offset from the position of the original selected portion of the object in the display updating step. The described editing and display updating steps are preferably continually repeated until the pointer is released from the screen in order to provide the user with a visual depiction of the editing operation as it proceeds.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention, together with further objects and advantages thereof, may best be understood by reference to the following description taken in conjunction with the accompanying drawings in which:

FIG. **1** is a block diagram of a computer system in accordance with the present invention.

FIG. **2** is a top plan view of the screen, case and keypad of the computer system of FIG. **1** with a graphical object being displayed on the screen.

FIG. **3**(*a*) illustrates a portion of the screen display shown in FIG. **2** with a triangular graphical object displayed thereon.